CLAIMS

What is claimed is:

1. An apparatus responsive to a resistive touch screen, the resistive touch screen having a first conductive layer and a second conductive layer separated from one another under quiescent conditions, the first and second conductive layers each having a first and second electrode, the apparatus comprising a detection circuit coupled for providing a first reference voltage to the first and second electrodes of the first conductive layer and providing a second reference voltage to the first and second electrodes of the second conductive layer wherein said detection circuit maintains said first and second reference voltages substantially constant during operation of the resistive touch screen.

2. The apparatus as recited in claim 1 wherein the resistive touch screen dissipates substantially zero power under quiescent conditions.

3. The apparatus as recited in claim 1 wherein approximately zero current is conducted by the first conductive layer and the second conductive layer under quiescent conditions.

4. The apparatus as recited in claim 3 wherein currents are conducted at the first and second electrodes of the first conductive layer when the first conductive layer couples to the second conductive layer and wherein currents are conducted at the first and second electrodes of the second conductive layer when the first conductive layer couples to the second conductive layer.

5. The apparatus as recited in claim 4 wherein the first and second electrodes are coupled to opposing ends of the first conductive layer in a y-direction, wherein the first and second electrodes are coupled to opposing ends of the second conductive layer in a x-direction, and wherein a location where the first and second conductive layers couple together is determined from said currents conducted at the first and second electrodes of the first and second conductive layers.

6. The apparatus as recited in claim 5 wherein a pressure applied to the resistive touch screen is calculated from said currents conducted at the first and second electrodes of the first and second conductive layers.

7. The apparatus as recited in claim 1 wherein said detection circuit comprises:

a first current to voltage converter having a first terminal coupled to the first electrode of the first conductive layer and a second terminal;

a second current to voltage converter having a first terminal coupled to the second electrode of the first conductive layer and a second terminal;

a third current to voltage converter having a first terminal coupled to the first electrode of the second conductive layer and a second terminal; and

a fourth current to voltage converter having a first terminal coupled to the first electrode of the second conductive layer and a second terminal;

8. The apparatus as recited in claim 7 further including an analog to digital converter responsive to said second terminals of said first, second, third, and fourth current to voltage converters.

9. The apparatus as recited in claim 8 wherein said detection circuit further including a microcontroller responsive to said analog to digital converter.

10. The apparatus as recited in claim 9 wherein said first current to voltage converter comprises:

an amplifier having a positive input coupled to said first reference voltage, a negative input coupled to said first terminal of said first current to voltage converter, and an output coupled to said second terminal of said first current to voltage converter; and

a resistor having a first terminal coupled to said output of said amplifier and a second terminal coupled to said first terminal of said first current to voltage converter.

11. The apparatus as recited in claim 9 wherein said second current to voltage converter comprises:

an amplifier having a positive input coupled to said first reference voltage, a negative input coupled to said first terminal of said second current to voltage converter, and an output coupled to said second terminal of said second current to voltage converter; and

a resistor having a first terminal coupled to said output of said amplifier and a second terminal coupled to said first terminal of said second current to voltage converter.

12. The apparatus as recited in claim 11 wherein said third current to voltage converter comprises:

an amplifier having a positive input coupled to said second reference voltage, a negative input coupled to said first terminal of said third current to voltage converter, and an output coupled to said second terminal of said third current to voltage converter; and

a resistor having a first terminal coupled to said output of said amplifier and a second terminal coupled to said first terminal of said third current to voltage converter.

13. The apparatus as recited in claim 12 wherein said fourth current to voltage converter comprises:

an amplifier having a positive input coupled to said second reference voltage, a negative input coupled to said first terminal of said fourth current to voltage converter, and an output coupled to said second terminal of said fourth current to voltage converter; and

a resistor having a first terminal coupled to said output of said amplifier and a second terminal coupled to said first terminal of said fourth current to voltage converter.

14. A method of operating a resistive touch sensitive screen for increased security and lower power consumption, the resistive touch screen comprising a first conductive layer and a second conductive layer, the first conductive layer having a first electrode and a second electrode, the second conductive layer having a first electrode and a second electrode, the method comprising the steps of:

applying substantially equal voltages to the first and second electrodes of the first conductive layer; and

applying substantially equal voltages to the first and second electrodes of the second conductive layer such that approximately zero current is conducted in the first and second conductive layers under quiescent conditions.

15. The method of operating a resistive touch sensitive screen as recited in claim 14 further including the steps of:

touching the resistive touch sensitive screen such that the first conductive layer couples to the second conductive layer; and

determining a location where the resistive touch sensitive screen is touched using currents from the first and second electrodes of the first conductive layer and currents from the first and second electrodes of the second conductive layer.

16. The method of operating a resistive touch sensitive screen as recited in claim 15 further including a step of determining a pressure applied to the resistive touch sensitive screen using currents from the first and second electrodes of the first conductive layer and currents from the first and second electrodes of the second conductive layer.

17. The method of operating a resistive touch screen as recited in claim 14 further including the steps of:

measuring currents from the first and second electrode of the first conductive layer;

measuring currents from the first and second electrode of the second conductive layer;

adding the currents from the first and second electrodes of the first and second conductive layers together;

sending an alert signal when the currents from the first and second electrodes of the first and second conductive layers added together do not equal approximately zero.

18. An apparatus comprising:

a resistive touch screen;

a substrate;

a plurality of current to voltage converters on said substrate responsive to said resistive touch screen; and

a plurality of wires coupling said resistive touch screen to said plurality of current to voltage converters wherein a voltage each of said plurality of wires remains substantially constant during operation of said resistive touch screen.

19. The apparatus of claim 18 further including:

an A/D converter on said substrate responsive to said plurality of current to voltage converters; and

a microcontroller on said substrate responsive to said A/D converter.

20. The apparatus of claim 18 wherein said plurality of wires conduct substantially zero current under quiescent conditions.

21. The apparatus of claim 18 wherein said plurality of wires conduct a current when said resistive touch screen is touched.

22. The apparatus of claim 19 wherein a pressure applied to said resistive touch screen is calculated from said currents conducted by said plurality of wires when said resistive touch screen is touched.